REMARKS

The disclosure of the Application is objected to because of an informality in the Title of the Invention, which recites "and Device" while the specification and claims are directed to a method. In response, the Title is amended in accordance with the Examiner's suggestion by eliminating the words "and Device", thereby overcoming the raised objection to the disclosure.

Next, claims 6 - 12 are rejected, under 35 U.S.C. 112, first paragraph, on the grounds that the specification does not support the limitation, added in the last response, of providing a warning to the driver that a parking brake has not been set. In response, the Examiner's attention is directed to the latter parts of paragraph [012], which states that the vehicle may be permitted to roll somewhat during the predetermined time period after the brake has been released to prevent the driver from leaving the vehicle.

The Applicant concurs in part with the Examiner's stated grounds for rejection of the claims under 35 U.S. 112, in particular with regard to whether the rolling of the vehicle constitutes a warning and the setting of a parking and the language of the claims is amended to comply with the specification. The Applicant believes that the entered amendments address and overcome the grounds for rejection under 35 U.S.C. 112, and respectfully requests that the Examiner reconsider and withdraw the rejection of the claims under 35 U.S.C. 112.

Claims 6-12 are then rejected, under 35 U.S.C. § 102(b), over each of Mikami et al. '673, Tsukamoto et al. '990 or Thomas '881. The Applicant acknowledges and respectfully traverses each of the raised anticipatory rejections in view of the following remarks.

After review of independent claims 6, 9 and 12, the claims are amended to more explicitly and clearly recite and define the present invention. The Applicant has elected to do so by canceling claims 6 and 12 in favor of new claim 13 which is an extensive rewording of the subject matter of claim 6. It will be noted, however, that new claim 13 contains the same subject matter and recitations as preceding claim 6. It will also be noted that previously submitted claims 9, 10 and 11 are retained in this Application as those claims recite the same limitations as are now recited in new claim 13, and in clearer and more explicit form than was recited in claim 6. It is respectfully submitted that these amendments to the claims are fully supported by the specification and claims as originally filed and do not add any new matter to or alter the subject matter of the invention, the specification or the claims.

Now considering the present invention as recited in new claim 13, the invention is directed to a method for preventing unintentional rolling of a stationary vehicle having an automated transmission and a clutch and includes the initial steps of, when the vehicle is stationary and the transmission is not in a neutral position, activating a brake pedal and, in response to activation of the brake pedal, activating a brake holding mode to maintain the vehicle stationary. The main focus of the present invention is to use a clutch, instead of a conventional torque converter, as the starting element for an automated transmission where the clutch has to be completely disengaged and is completely opened. According to the prior art, the torque converter remains at least partially filled to facilitate a rapid response time.

Upon subsequent deactivation of the brake pedal, the method determines the current displacement, that is, degree of engagement, of the clutch wherein the displacement of the clutch is determinative of, or indicates, a torque transmitted through the clutch. When the clutch displacement indicates that the torque transmitted through the clutch is of at least a sufficient takeover torque to prevent rolling of the vehicle, the brake holding mode is deactivated, because the torque transmitted through the clutch is sufficient to prevent rolling of the vehicle.

When, however, the clutch displacement indicates that the torque transmitted through the clutch is less than the takeover torque, that is, the torque is insufficient to prevent rolling of the vehicle, and if the brake pedal has not been reactivated within a timing delay period after the activation of the brake pedal, the brake holding mode is deactivated for a predetermined time period. The deactivation of the brake holding mode during the predetermined time period the permits the vehicle to roll to a certain degree during the predetermined time period and, as stated in the specification, thereby prevents the driver from leaving the vehicle.

Turning now to the cited prior art references, Mikami et al. '673 relates to a control system for an automatic transmission that prevents rolling of a vehicle on, for example, a hill when the vehicle is stopped. According to Mikami et al. '673, the transmission includes a hydraulic power transmission connected from the engine, a clutch that is engaged when a forward driving range is selected, a brake that can be engaged to prevent the vehicle from rolling backward and to thereby establish a hill-holding state in the transmission, an accelerator pedal and a brake pedal.

The system further includes a clutch disengaging system that places the clutch in a neutral state when the clutch is almost disengaged and a brake engaging system that engages the brake to establish the hill-holding state and that disengages the brake when the clutch is nearly disengaged, that is, is placed into the neutral state, by the clutch disengaging system.

According to Mikami et al. '673, control system detects and indicates when the vehicle is stopped by the concurrent occurrence of a vehicle speed of zero as indicated by a speed output signal from a speed controller, the release of the accelerator pedal is released, and the depression of the brake pedal.

At this time, the clutch disengaging system responds to the stopping of the vehicle as indicated by the control system by starting the disengagement of the clutch, and places the clutch in the neutral state when the clutch is nearly disengaged. The brake engaging system, in turn, responds to the operation of the clutch disengaging system by placing the brake in the engaged state, thereby establishing the hill-holding state, when the clutch is nearly disengaged. In a preferred embodiment, the control system includes a delay system which delays the engagement of the brake and the establishment of the hill-holding state until a predetermined time after the clutch disengagement system has placed the clutch in the neutral state, so that the hill-holding state is not started when the clutch is still partially engaged.

It must be noted that Mikami et al. '673 does not describe how the hill-holding state is terminated, but it may be assumed that the disengagement of the brake and the termination of the hill-holding state will occur when the clutch is placed in a non-neutral position, such as "forward", and the accelerator pedal is depressed, indicating that the vehicle is to resume movement.

It is therefore apparent that there are a number of fundamental distinctions between the present invention as recited in new independent claim 13, and the teachings of Mikami et al. '673. For example, Mikami et al. '673 states that the control system detects when the vehicle stops by detecting the speed of the vehicle, the depression of the brake pedal and the release of the accelerator pedal and that, upon these conditions, the clutch system places the clutch in a neutral position and the brake system engages the brake when the clutch goes into the neutral position, thereby establishing the hill-holding state. In complete and fundamental contrast from the presently claimed invention, the Mikami et al. '673 system requires that the clutch be placed in the neutral state, that is, disengaged, before the vehicle is determined to be in the stopped state and before the brake can accordingly be engaged. The method of the presently claimed invention, however, requires that the clutch be in a non-neutral state, that is, that the clutch be engaged, when the vehicle is determined to be in the stopped state and the brake is engaged, which is the exact reverse of the Mikami et al. '673 system.

In even more fundamental distinction between the present invention and Mikami et al. '673, it must be noted that Mikami et al. '673 does not describe any method steps or conditions under which the brake is disengaged and the vehicle taken out of the hill-holding state.

Mikami et al. '673 therefore does not, and cannot, teach, suggest disclose or hint at the method steps of the present invention wherein upon a subsequent deactivation of the brake pedal the amount of torque then being transferred through the clutch is determined by determining the current displacement, that is, degree of engagement, of the clutch wherein the displacement of the clutch indicates the amount of torque being transmitted through the clutch. In fact, this step would be both useless and impossible in the Mikami et al. '673 system because, as described above, the Mikami et al. '673 system requires that the clutch be in the neutral position, so that no torque could be transferred through the clutch.

In a like manner, Mikami et al. '673 does not teach or suggest that the brake holding mode be deactivated when the amount of torque then being transmitted through the clutch is found to be at least a takeover torque sufficient to prevent rolling of the vehicle, so that the brake holding mode is deactivated because the torque transmitted through the clutch is sufficient to prevent rolling of the vehicle without assistance from the brake.

In still further fundamental distinction between the present invention and the teachings of Mikami et al. '673, Mikami et al. '673 does not teach, suggest, disclose or hint at that the brake holding mode be deactivated for a predetermined time period if (a) the clutch displacement indicates that the torque transmitted through the clutch is less than the takeover torque and (b) the brake pedal has not been reactivated within a timing delay period after the initial activation of the brake pedal. That is, Mikami et al. '673 does not suggest at any point that brake holding mode be deactivated to allow the vehicle to roll to a certain degree if certain conditions are met.

It is therefore the Applicant's belief and position that for at least the reasons discussed above Mikami et al. '673 does not teach, suggest, disclose or hint at the present invention to those of ordinary skill in the arts under the requirements and provisions of 35 U.S.C. 102, and that the present invention, as recited in the pending claims as amended above, is therefore patentably distinguished over and from the teachings of Mikami et al. '673. The Applicant therefore respectfully requests that the Examiner reconsider and withdraw all rejections of the claims over Mikami et al. '673, and allow the claims as presented herein above.

Therefore next considering the teachings of Tsukamoto et al. '990, this reference relates to an automatic transmission control system for preventing backward rolling of the vehicle on an upward slope by engaging the brake when the vehicle is detected to be on a slope to thereby prevent rolling of the vehicle. The primary and inventive concept in the Tsukamoto et al. '990 control system appears to concern control of the clutch and the brake so as to prevent the vehicle from rolling when the brake is released upon subsequent operation of either, or both, of the brake and the accelerator pedals so as to resume motion of the vehicle.

According to Tsukamoto et al. '990, the vehicle and transmission includes an automatic transmission, a clutch, a clutch brake, a hydraulic clutch servo for engaging the clutch, a hydraulic brake servo for engaging the brake, an accelerator pedal, a brake pedal controlling a vehicle brake, and a vehicle speed detector for indicating at least when the vehicle is in motion. The control means, in turn, includes a vehicle stop determining means and an uphill determining means wherein the vehicle stop determining means is responsive to the speed detector and the accelerator and brake pedals for determining when the vehicle is stopped. According to Tsukamoto et al. '990, the vehicle is in the stopped state if and when the vehicle speed is substantially zero, the accelerator pedal is released, and the foot brake pedal is depressed. The uphill determining means, in turn, determines whether the vehicle is on a slope and the vehicle is determined to be on a slope if the vehicle is in the stopped state and the vehicle speed is determined to be non-zero.

If the vehicle is determined to be in the stopped state and if the vehicle is determined to be on a slope, the control system controls the hydraulic brake servo to engage the brake to thereby prevent rolling of the vehicle. Once the vehicle has been determined to be in the stopped state and on a slope and the brake is engaged to prevent rolling of the brake, the Tsukamoto et al. '990 control system interprets any activation of the brake pedal or the accelerator pedal, or both, as an indication that the driver intends that the vehicle will resume motion. This action, in turn, requires that the brake be disengaged and the clutch be engaged and the control system accordingly directs the hydraulic clutch servo to begin engagement of the clutch and the hydraulic brake servo to begin disengagement of the brake.

As discussed above, the vehicle may roll in an undesired manner during the period in which the clutch is engaged and the brake is disengaged if the brake becomes sufficiently disengaged to allow the vehicle to roll and while the clutch is not yet sufficiently engaged to provide a hill holding torque to prevent rolling of the vehicle. According to Tsukamoto et al.

`990, this condition is particularly prone to occurring if the driver is actuating both the brake pedal and the accelerator pedal at the same time, which is apparently common with a number of drivers, because joint operation of the two pedals can put the servos into this undesired state. Tsukamoto et al. `990's control system prevents this condition from arising, however, by imposing a time delay on the release of the brake if the vehicle has been stopped and has been determined to be on a slope.

It is therefore apparent that there are a number of fundamental distinctions between the presently claimed invention and the teachings of Tsukamoto et al. `990. For example, Tsukamoto et al. `990 states that the control system detects when the vehicle stops by detecting the speed of the vehicle, the depression of the brake pedal and the release of the accelerator pedal and that, upon these conditions, the clutch system places the clutch in a disengaged position and, if the vehicle is determined to be on a slope, the control system engages the brake to prevent rolling of the vehicle. In complete and fundamental contrast from the presently claimed invention, the Tsukamoto et al. `990 system , like the Mikami et al. `673 system, requires that the clutch be placed in the neutral state, that is, disengaged, before the vehicle is determined to be in the stopped state and before the brake can accordingly be engaged. The method of the presently claimed invention, however, requires that the clutch be in a non-neutral state, that is, that the clutch be engaged, when the vehicle is determined to be in the stopped state and the brake is engaged, which is the exact opposite of the Tsukamoto et al. `990 and the Mikami et al. `673 systems.

In further fundamental distinction between the present invention and the Tsukamoto et al. `990 system, the Tsukamoto et al. `990 system determines not only whether the vehicle is initially stopped, but subsequently determines whether the vehicle is on a slope by determining whether the vehicle is subsequently moving because it is on a slope by performing a second measurement of the vehicle speed. As described, the Tsukamoto et al. `990 system places the vehicle in the "hill holding" mode only if the vehicle is both stopped and subsequently moves due to being on a slope.

In contrast, the present invention engages the brake to prevent rolling of the vehicle solely on the basis of whether the vehicle is stopped and whether the clutch is engaged, that is, whether the transmission is not in the neutral state. The operation of the present invention thereby is not dependent in any way on whether or not the vehicle is on a slope and the present invention accordingly does not determine or measure whether or not the vehicle is on a slope.

In further fundamental distinction between the present invention and Tsukamoto et al. `990, it must be noted that, as discussed above, the Tsukamoto et al. `990 system treats any activation of either, or both, of the brake and accelerator pedals when the vehicle is in the stopped state and on a slope, as a command to resume motion of the vehicle. As described, the Tsukamoto et al. `990 system then begins engagement of the clutch and, after a delay, disengagement of the brake, without further determination of the state of the vehicle.

In basic contrast and distinction from the Tsukamoto et al. '990 system, however, the present invention determines the torque actually being provided to the vehicle through the clutch at that time before releasing the brake, thereby insuring that the clutch is providing at least a level of takeover torque sufficient to prevent rolling of the vehicle.

Tsukamoto et al. '990 therefore does not and cannot teach, suggest, disclose or hint at the method steps of the present invention wherein upon a subsequent deactivation of the brake pedal, the amount of torque then being transferred through the clutch be determined by determining the current displacement, that is, the degree of engagement of the clutch, wherein the displacement of the clutch indicates the amount of torque being transmitted through the clutch.

In a like manner, Tsukamoto et al. '990 does not teach, suggest, disclose or hint at that the brake holding mode be deactivated when the amount of torque then being transmitted through the clutch is found to be at least a takeover torque sufficient to prevent rolling of the vehicle, so that the brake holding mode can be deactivated because the torque transmitted through the clutch is sufficient to prevent rolling of the vehicle without assistance from the brake.

In still further fundamental distinction between the present invention and the teachings of Tsukamoto et al. '990, it will be noted that, as described above, any activation of either or both of the brake and accelerator pedals will result in engagement of the clutch and disengagement of the vehicle, and in no other actions. Tsukamoto et al. '990 therefore does not teach or suggest that the brake holding mode be deactivated for a predetermined time period if (a) the clutch displacement indicates that the torque transmitted through the clutch is less than the takeover torque and (b) the brake pedal has not been reactivated within a timing delay period after the initial activation of the brake pedal. That is, Tsukamoto et al. '990 does not suggest at any point that brake holding mode be deactivated to allow the vehicle to roll to a certain degree if certain conditions are met, but merely goes directly from the "hill holding" state to the "resume motion state".

It is therefore the Applicant's belief and position that for at least the reasons discussed above Tsukamoto et al. '990 does not teach, suggest, disclose or hint at the present invention to those of ordinary skill in the arts under the requirements and provisions of 35 U.S.C. 102, and that the present invention, as recited in the claims as amended above, is therefore patentably distinguished over and from the teachings of Tsukamoto et al. '990. The Applicant therefore respectfully requests that the Examiner reconsider and withdraw all rejections of the claims over Tsukamoto et al. '990, and allow the pending claims.

Lastly considering the teachings of Thomas '881, this reference relates to a system for controlling the wheel brakes of a vehicle in the neutral idle (non-moving, neutral) state to prevent rolling of the vehicle on a slope. According to Thomas '881, when the vehicle speed is zero, the control system measures the hydraulic pressure in the brake system and the current

angle of any slope of the vehicle, that is, whether the vehicle is on a slope and the degree of the slope. The control system then determines whether the pressure in the brake system is sufficient to prevent the vehicle from rolling at the current angle of slope of the vehicle, and disengages the clutch, that is, places the transmission in the neutral state, only if the brake pressure is sufficient to prevent rolling of the vehicle at that angle of slope.

It is therefore apparent that there are a number of fundamental distinctions between the present invention and the teachings of Thomas '881. For example, Thomas '881 describes only a method for safely disengaging a clutch by insuring that the brakes are sufficiently engaged to prevent motion of the vehicle when the vehicle is on a slope before permitting the clutch to be disengaged.

In contrast, the present invention engages the brake to prevent rolling of the vehicle on the basis of whether the vehicle is stopped and whether the clutch is engaged, that is, whether the transmission is not in the neutral state. The operation of the present invention is thereby determined, in part, by the state of the clutch, not the state of the clutch by the condition of the brake, and the present invention is not dependent, in any way, on whether or not the vehicle is on a slope. As such, and in further distinction, the present invention accordingly does not determine or measure whether or not the vehicle is on a slope.

In further fundamental distinction between the present invention and Thomas '881, Thomas '881 does not teach, suggest, disclose or hint at any method steps for disengaging the brakes and engaging the clutch, except perhaps by manual operation of the driver. More specifically, Thomas '881does not teach, suggest, disclose or hint at that upon subsequent deactivation of the brake pedal, the current displacement, that is, the degree of engagement of the clutch, be determined wherein the displacement of the clutch is determinative of, or indicates, a torque transmitted through the clutch.

Thomas '881does not teach, suggest, disclose or hint at the brake holding mode may be deactivated when the clutch displacement indicates that the torque transmitted through the clutch is of at least a takeover torque sufficient to prevent rolling of the vehicle.

In a like manner, Thomas '881 does not teach, suggest, disclose or hint at that the brake holding mode could be deactivated for a predetermined time period when the clutch displacement indicates that the torque transmitted through the clutch is less than the takeover torque, that is, is not sufficient to prevent rolling of the vehicle, and the brake pedal has not been reactivated within a timing delay period after the activation of the brake pedal. Thomas '881 does not teach, suggest, disclose or hint at the vehicle being permitted to roll to a certain degree during that predetermined time period.

It is therefore the Applicant's belief and position that for at least the reasons discussed above, Thomas '881 fails to teach, suggest, disclose or hint at the present invention to those of ordinary skill in the arts under the requirements and provisions of 35 U.S.C. 102, and that the present invention, as recited in the claims as amended above, is therefore patentably distinguished over and from the teachings of Thomas '881. The Applicant therefore respectfully

requests that the Examiner reconsider and withdraw all rejections of the claims over Thomas '881, and allow the pending claims.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

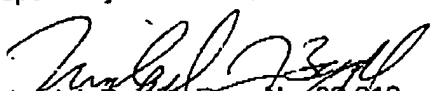
In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejection(s) should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Mikami et al. '673, Tsukamoto et al. '990 and/or Thomas '881 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



Michael J. Bujold, Reg. No. 32,018
Customer No. 020210
Davis Bujold & Daniels, P.L.L.C.
112 Pleasant Street
Concord, NH 03301-2931
Telephone 603-226-7490
Facsimile 603-226-7499
E-mail: patent@davisandbujold.com